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NOTES ON GEOGRAPHIC DISTRIBUTION

Distribution of *Megalobulimus sanctipauli* (Ihering and Pilsbry, 1900) (Gastropoda: Megalobulimidae) in South America

Ariel Aníbal Beltramino

División Zoología Invertebrados, Facultad de Ciencia Naturales y Museo. Universidad Nacional de La Plata. Paseo del Bosque s/n°. B1900WFA. La Plata, Argentina.
Agencia Nacional de Promoción Científica y Tecnológica (ANPCyT).
Email: *aabeltramino@fcnym.unlp.edu.ar*

ABSTRACT: The terrestrial snail *Megalobulimus sanctipauli* (Ihering and Pilsbry, 1900), described from Botucatú, São Paulo State, Brazil, is known to occur in Brazil, Paraguay and Argentina. The historical distribution of the species is reviewed here and a distribution map is presented for the first time.

The first record, a single shell, of *Megalobulimus sanctipauli* (Ihering and Pilsbry, 1900) was collected by Ihering in 1897 from Botucatú, São Paulo, Brazil. It deposited on September 7, 1897 in the Academy of Natural Sciences of Philadelphia collection (ANSP 71229; Pilsbry 1901). Based on this unique specimen, Pilsbry (1900) described *Strophocheilus oblongus* var. *sanctaepauli* (Pilsbry 1900). Later, in agreement with Ihering, Pilsbry (1901), raised it to species rank as *Strophocheilus* (*Borus*) *sanctaepauli*; and in 1902 he emended the species name to *sanctipauli* (Pilsbry 1902; Bequaert 1948). Bequaert´s (1948) measurements of the type are: length, 86 mm; width in front view, 44 mm; width in profile, 38 mm; aperture length, 45 mm; aperture width, 21 mm; whorls 5½. The original description of *M. sanctipauli* was based on conchological features (Pilsbry 1900). Illustrations of the species can be found in Pilsbry (1901), Bequaert (1948), and Simone (2006). More than a century later, in the absence of anatomical, morphometric, genetic and ecological data, the species is still only recognized by shell features.

According to the literature, *M. sanctipauli* occurs in southern Brazil, Paraguay, and Misiones and Corrientes in northeastern Argentina (Parodiz 1957; Fernández 1973; Simone 2006). However, the distribution of this species remains poorly known. Based only on the literature and museum databases, occurrence records of *M. sanctipauli* are collated, and a distribution map for the species is presented for the first time.

Records were obtained from selected literature: Pilsbry (1901); Bequaert (1948); Lange de Morretes (1949, 1953); Quintana (1982); Fernández (1973); Cuezzo and Drahg (1995); and Simone (2006). Also museum databases from six zoological collections were revised for corroborating published information: Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN), Buenos Aires, Argentina; Instituto-Fundación Miguel Lillo (IFML), San Miguel de Tucumán, Tucumán, Argentina; Academy of Natural Sciences Philadelphia (ANSP), Philadelphia, Pennsylvania, USA; Museum of Comparative Zoology (MCZ), Cambridge, Massachusetts, USA; Field Museum of Natural History (FMNH), Chicago, Illinois, USA; and National Museum of Natural History, Smithsonian Institution (USNM), Washington, D.C., USA. Databases from North American museums were consulted online (Table 1), and those from Argentina were requested to collection managers.

Given that geographic coordinates were not provided as part of the original data for any of the records, the georeferenced positions for each of them were derived secondarily (Table 1) by using the point-radius method described in Wieczorek *et al.* (2004). These data were mapped using ArcGIS v.9.3 (ESRI 2008).

Eighteen locality records were found for the species (Figure 1, Table 1). The map shown here refines the known distribution of *M. sanctipauli*, and will be helpful in directing future search efforts and gathering further information on the species, including species' biology and its conservation status.

Table 1. Occurrence data of *Megalobulimus sanctipauli* used to map distribution.

#	LOCALITY	GEOGRAPHICAL COORDINATES	ERROR	REFERENCES	COMMENTS
	Brazil				
	São Paulo				
1	Botucatú	22°53'07" S 48°27'56" W	40 km	Pilsbry (1901); Bequaert (1948); Lange de Morretes (1949, 1953); Fernández (1973); Simone (2006)	Type locality. Holotype (ANSP 71229) Record available at: http://mczbase.mcz.harvard.edu/
2	Cerqueira César	23°02'09" S 49°09'58" W	24 km	Bequaert (1948)	This locality is mentioned by Bequaert (1948) from material deposited in MCZ, although the author did not specify the collection number. It is assumed to be MCZ 179230. Record available at: http://mczbase.mcz.harvard.edu/
	Paraná				
3	Paranaguá	25°33'01" S 48°34'02" W	21 km	Bequaert (1948)	This locality is mentioned by Bequaert (1948) from material deposited in MCZ, although the author did not specify the collection number
4	Palmeira	25°26'33" S 50°02'45" W	31 km	Lange de Morretes (1953)	Only locality mentioned. The author did not specify where the material was deposited
5	São José da Boa Vista	23°57'46" S 49°39'58" W	15 km	Lange de Morretes (1953)	Only locality mentioned. The author did not specify where the material was deposited
6	Sengés	24°16'41" S 49°25'21" W	40 km	Lange de Morretes (1949, 1953)	Only locality mentioned. The author did not specify where the material was deposited
7	Guarapuava	25°26'17" S 51°37'16" W	34 km	Lange de Morretes (1953)	Only locality mentioned. The author did not specify where the material was deposited
8	Campo Mourão	24°07'57" S 52°23'44" W	20 km	Lange de Morretes (1953)	Only locality mentioned. The author did not specify where the material was deposited
	Paraguay				
	Canindeyú				
9	Puerto Adela	24°29'13" S 54°23'03" W	1 km	Quintana (1982)	Only locality mentioned. The author did not specify where the material was deposited, but according to the work, it was the own author who examined the specimens reported
	Alto Paraná				
10	Puerto Bertoni	25°39'26" S 54°35'36" W	1 km	Bequaert (1948); Quintana (1982)	This locality is mentioned by Bequaert (1948) from material deposited in USNM, although the author did not specify the collection number. It is assumed to be USNM 171461. Record available at: http://collections.mnh.si.edu/search/iz/ Quintana (1982) also collected material from the same place, although the author did not specify where the material was deposited. According to the work, it was the own author who examined the material reported
11	Puerto Indio	24°55'30" S 54°29'19" W	5 km	Quintana (1982)	Only locality mentioned. The author did not specify where the material was deposited, but according to the work, it was the own author who examined the specimens reported
12	Puerto Palma	25°17'02" S 54°32'04" W	4 km	Quintana (1982)	Only locality mentioned. The author did not specify where the material was deposited, but according to the work, it was the own author who examined the specimens reported
13	Puerto Presidente Stroessner (presently Ciudad del Este)	25°30'11" S 54°40'45" W	12 km	Quintana (1982)	Only locality mentioned. The author did not specify where the material was deposited, but according to the work, it was the own author who examined the specimens reported
	Argentina				
	Misiones				
14	Puerto Aguirre (presently Puerto Iguazú)	25°36'46" S 54°34'08" W	3 km	Cuezzo and Drahg (1995)	This locality is mentioned by Cuezzo and Drahg (1995) for IFML 258. There is also a record from the same locality designated as *M. sanctipauli* under the collection number FMNH 216421, available at: http://emuweb.fieldmuseum.org/iz/mollusks.php
15	Piñalito	26°25'36" S 53°50'27" W	12 km	Cuezzo and Drahg (1995)	This locality is mentioned by Cuezzo and Drahg (1995) for IFML 116
16	Puerto Bemberg	25°55'09" S 54°36'12" W	2 km	Cuezzo and Drahg (1995)	This locality is mentioned by Cuezzo and Drahg (1995) for IFML 69. There is also a record from the same locality designated as *M. sanctipauli* under the collection number FMNH 216384, available at: http://emuweb.fieldmuseum.org/iz/mollusks.php
17	Puerto Rico	26°48'23" S 55°01'28" W	2 km	Fernández (1973)	This locality in mentioned by Fernández (1973) for MACN 25821
	Corrientes				
18	Isla Apipé	27°30'30" S 56°51'33" W	13 km	Cuezzo and Drahg (1995)	This locality is mentioned by Cuezzo and Drahg (1995) for IFML 58. There is also a record from the same locality designated as *M. sanctipauli* for the material FMNH 216382, available at: http://emuweb.fieldmuseum.org/iz/mollusks.php

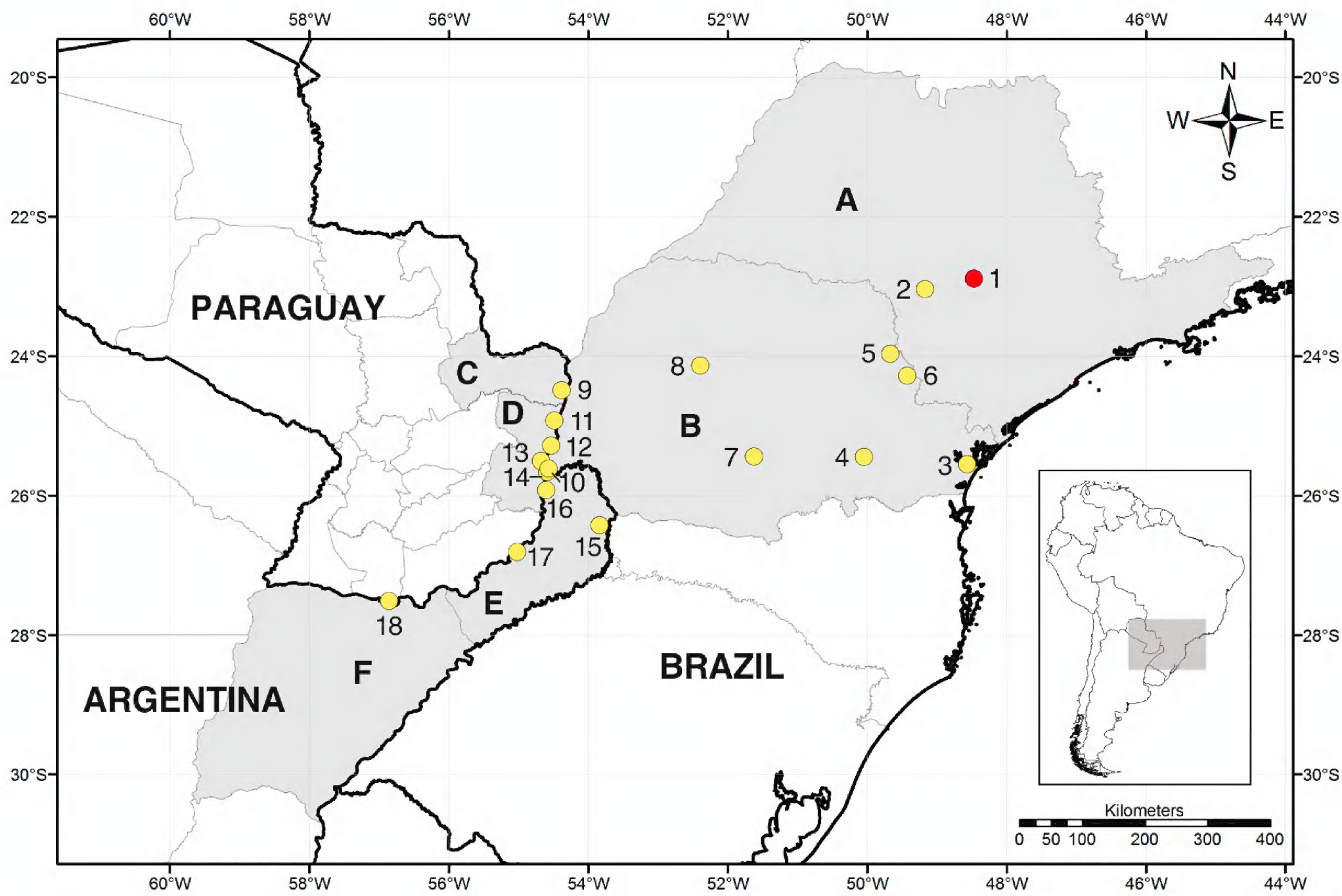

Figure 1. Distribution of *Megalobulimus sanctipauli* in South America. Highlighted in gray (total area about 596,260 km2): A) São Paulo State (Brazil); B) Paraná State (Brazil); C) Canindeyú Department (Paraguay); D) Alto Paraná Department (Paraguay); E) Misiones Province (Argentina); and F) Corrientes Province (Argentina). Locality numbers correspond to those presented in Table 1. Red dot: type locality.

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